**Plant Biology**

**Drawings required in your sketchbook.**

1. Draw and label a cross structure of a stem as seen through a microscope. Be sure to note the location of the phloem and xylem in relation to other structures and each other.
2. Draw and label the internal structure of a dicot seed.
3. Draw and label the internal structure of a monocot seed.
4. Draw and label the half-view of an animal pollinated flower.

**9.1 Transport in the xylem of plants**

*Textbook pages: 386-391*

*Study Guide pages:111-113; 115*

1. Explain the cohesive properties of xylem.
2. What is the source of water lost as a result of transpiration?
3. Explain how the adhesive properties of water and evaporation generate tension forces in leaf cell walls.
4. Why does gas exchange lead to transpiration?
5. Explain how increased mineral absorption in the roots increases the rate of osmosis.
6. List and describe the adaptations of desert plants for water conservation.
7. List and describe the adaptations of plants that grow in saline soils for water conservation.
8. How can a photometer be used to measure the rate of transpiration?
9. Design an experiment to test the effect of temperature on the rate of transpiration.
10. Design an experiment to test the effect of humidity on the rate of transpiration.
11. The properties of water are very important in allowing fluid movement from the roots to the top of a plant. Why does water form hydrogen bonds between its molecules and the sides of the xylem?
12. Why are leaves essential to fluid transport in plants?
13. What is the usual cause of plant wilting?
    1. **Transport in the phloem of plants**

*Textbook pages: 393-397*

*Study Guide pages: 114; 116-117*

1. Explain the flow of organic material in the phloem of the plant. Be sure to include the origin and sink.
2. Explain hydrostatic pressure gradients.
3. Describe the effect of hydrostatic pressure on the movement of organic materials.
4. What type of transport is used to load organic compounds into phloem sieve tubes at the origin of organic materials?
5. How does high concentration of solutes at the origin of organic materials affect osmosis?
6. Detail the structure and function relationship of phloem sieve tubes.
7. Explain how data from aphid stylets can be used to measure rates of phloem transport.
8. Explain how data from radioactively-labeled carbon dioxide can be used to measure rates of phloem transport.
9. Draw the challenge yourself diagram from the pink box on page 396 in your textbook and answer the associated questions.
10. Explain when a seed would be a sink for organic materials and when it would be a source of organic materials.
11. Why is it necessary for the veins to be relatively close together in plants?

* 1. **Growth in Plants**

*Textbook pages: 398-403*

*Study Guide pages: 117-118; 120*

1. What is the function of the undifferentiated cells in the meristem?
2. Why do the cells undergo mitosis and cell division in the shoot apex?
3. What plant hormones are responsible for growth in the shoot apex?
4. How does auxin influence the rate of cell growth?
5. List and describe the environmental tropisms that cause a response in shoots.
6. Explain the process of micropropagation of plants using tissue from the shoot apex, nutrient agar gels and growth hormones.
7. Describe practical applications for micropropagation.
8. What is the function of an auxin efflux pump in plant cells?
   1. **Reproduction in Plants**

*Textbook pages: 403-411*

*Study Guide pages: 119*

1. Explain the relationship between gene expression in the shoot and flowering.
2. What controls the flowering of short day plants like chrysanthemums?
3. What controls the flowering of long day plants?
4. Define the following terms:
   1. Pollination
   2. Fertilization
   3. Seed dispersal
5. Describe the mutualistic relationship between plants and pollinators in the sexual reproduction of plants.
6. How would you induce a short day plant to flower out of season?
7. Why is oxygen important for the germination of seeds?
8. Suggest some of the reasons that pollinators are in trouble worldwide.